REMARKS

Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested.

The Examiner rejects claims 1 and 19 under 35 U.S.C. 102(b) as being anticipated by Hasting. The Examiner states that Hasting discloses the claimed invention a switch mode converter including a switching transistor, an inductor, a freewheeling transistor, a control circuit, a discontinuity detector, a first timing circuit and a feedback control circuit.

This rejection is respectfully traversed. Hasting utilizes the detection to turn off the synchronous rectifier under light loads. However, it does not show or suggest determining the portion of the cycle of the switching transistor during which the converter is in discontinuous mode, which is recited in claims 1 and 19. In addition, Claim 19 recites that the feedback control circuit is responsive to this timing measurement to alter the value of the voltage divider. Applicants have amended Claim 1 herein to recite that the feedback controller is responsive to the determined portion of the cycle of the switching transistor during which the converter is in discontinuous mode which alters the feedback control signal of the converter, in order to clarify the claim for the Examiner. In view of the fact that this is an '102 rejection, the reference must show all of the features of the claims, which it does not. Therefore, the Examiner's '102 rejection must fail.

The Examiner rejects claims 15-17 under 35 U.S.C. § 102(b) as being anticipated by Kondo. The Examiner states that Kondo discloses the claimed invention and method for controlling a switching mode converter, detecting a discontinuous current flow in the inductor with feedback characteristics, the switching transistor shutoff, determining that the converter remains in discontinuous mode for n cycles. For this last element, the Examiner specifically recites Column 18, lines 1-25.

This rejection is respectfully traversed. Kondo shows the utilization of the detection of a discontinuous current flow to turn off the synchronous rectifier, but fails to show or suggest the measuring of the amount of time of discontinuous current flow in the inductor and changing the feedback characteristics of the converter, the Examiner's statements to the contrary notwithstanding. The feedback characteristics referred to by the Examiner at Column 7, Lines 25-60 only discusses the utilization of the feedback to control the output voltage, which is found in any switching regulator. Similarly, the shut off of the switching transistor stated by the Examiner to appear at the same portion of the specification only discussed the activation of the switching transistor and synchronous rectifier so that they are both not on at the same time, in order to prevent shoot through or crowbar current, as is well known in the art. This is unrelated to the changing of the feedback characteristics of the converter responsive to the measured amount of time there is discontinuous current flow in the inductor, as recited in Claim 15. With respect to the Examiner's recitation that Column 18, Lines 1-25 show a converter remaining in the discontinuous mode for n cycles, Applicant can not find any mention of this feature in this portion of the reference. In view of the fact that this is an '102 rejection, and the fact that all of the features of Claim 15 are not shown in the reference, the Examiner's rejection must fail. However, Applicant's have amended Claim 15 in order to clarify the claim by reciting that the change in the feedback characteristics of the converter in response to the measured amount of time results an improvement of the voltage regulation.

The Examiner rejects claims 1-20 under 35 U.S.C. § 103(a) as being unpatentable over Walter et al. in combination with Hasting and Kondo. The Examiner states that Walters et al. discloses the claimed invention a switching mode converter including a switching transistor, an inductor, a control circuit, a feedback loop but does not disclose the utilization of the technique for discontinuous mode and timing circuit. The Examiner states that Hasting teaches the utilization of similar technique for discontinuous mode and that Kondo teaches the utilization of a similar technique for a timing circuit. The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Walters et al. converter by utilizing the technique taught by Hasting and Kondo for the purpose of increasing efficiency of the converter.

We can not agree. Applicant's agree with the Examiner that Walter's does not show or suggest a technique for discontinuous mode and a timing circuit. As stated above, although Hastings does disclose a technique for discontinuous mode, it does not disclose the determination of the portion of the cycle of the switching of the transistor which is in the converter is in the discontinuous mode or the feedback controller coupled to the discontinuity detector to alter the feedback control of the converter. The Examiner's case is not improved by adding Kondo, since Kondo shows the utilization of the measurement of discontinuous current to turn off the synchronous rectifier, here shown as a switch (15), in order avoid discharging the output capacitor when the converter is in the discontinuous mode. Looking at the Examiner's recitation of Column 18, Lines 5-18, the timing that he refers to has to do with making sure that the switching transistor and synchronous rectifier are not on at the same time, because this would result in a large surge of current through the transistors which might damage the transistors. It does not show changing of the feedback characteristics of the converter in response to the measurement amount of time nor does it show improving the voltage regulation, as in the present invention.

Applicant's have amended the Brief Description of the Drawings to conform to the formal drawings submitted herewith.

Accordingly, Applicants believe the Application, as amended, is in condition for allowance, and such action is respectfully requested.

Respectfully submitted,
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